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Title: Control of Delta Robot and Development of Servo Hook using Python Programming

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Control of Delta Robot and Development of Servo Hook using Python Programming

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Mar. 10th, 2016

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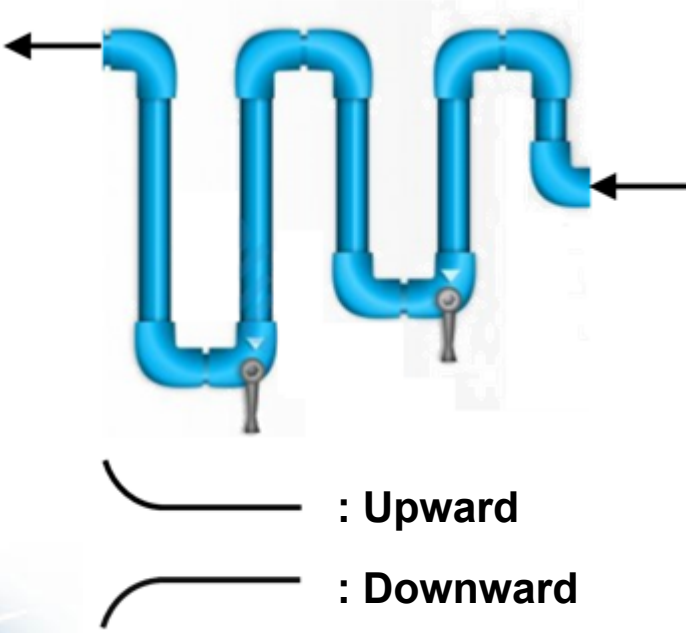
Contents

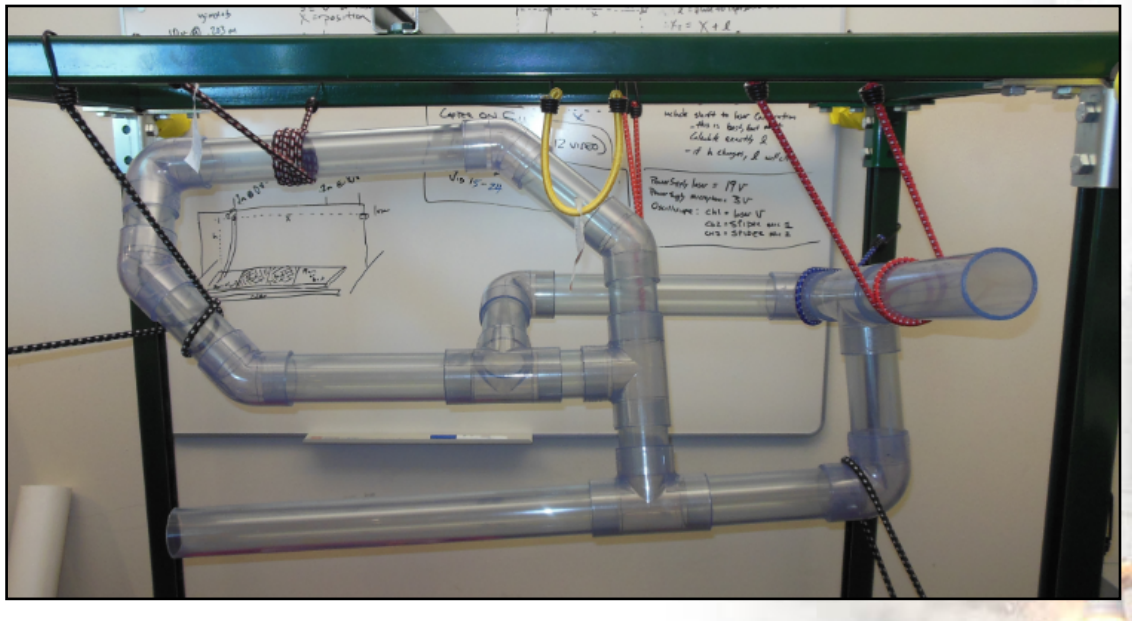
1. Shape Memory Alloy

Why do we need a shape memory alloy?

- To detect the locations of damage in a narrow pipeline using a shape memory alloy (SMA) equipped with tiny camera.
- SMA is an alloy that "remembers" its original shape and that when deformed returns to its pre-deformed shape when heated. (Heat control: PWM)



< Concept of damage detection using a SMA >

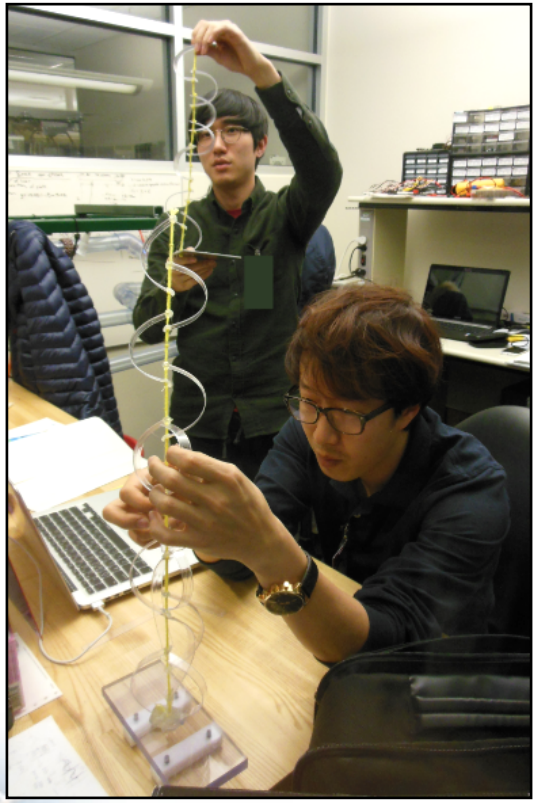


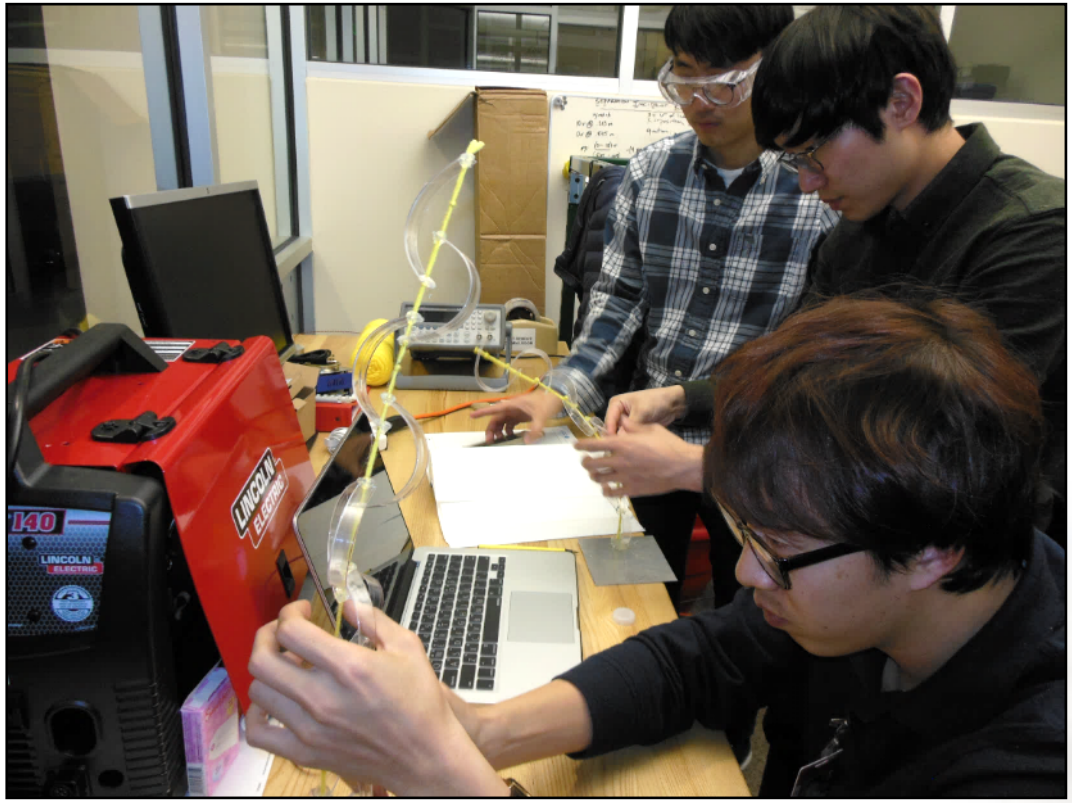
< Narrow pipeline >

2. String Tower

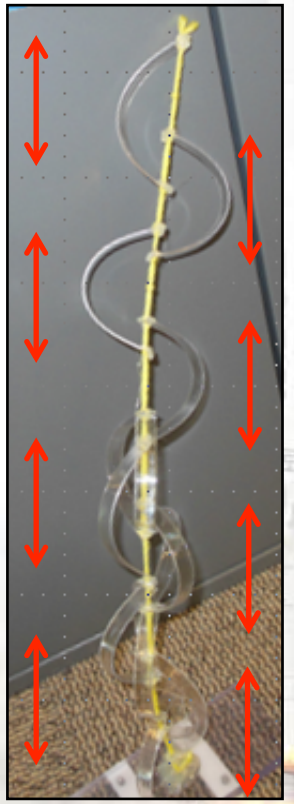
Why did we make a string tower?

- To understand about tension.
- A string tower is being held up by constant tension.





< Making the string tower >

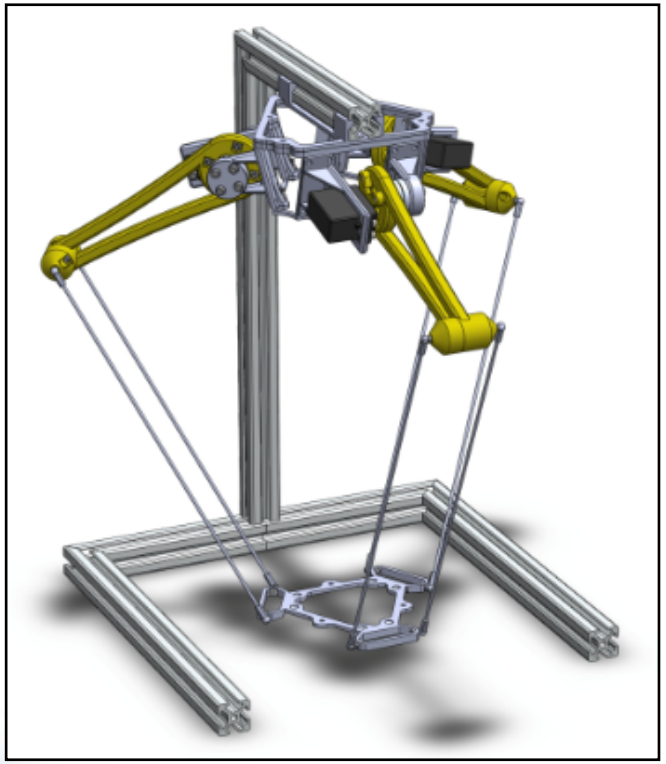


< String tower >

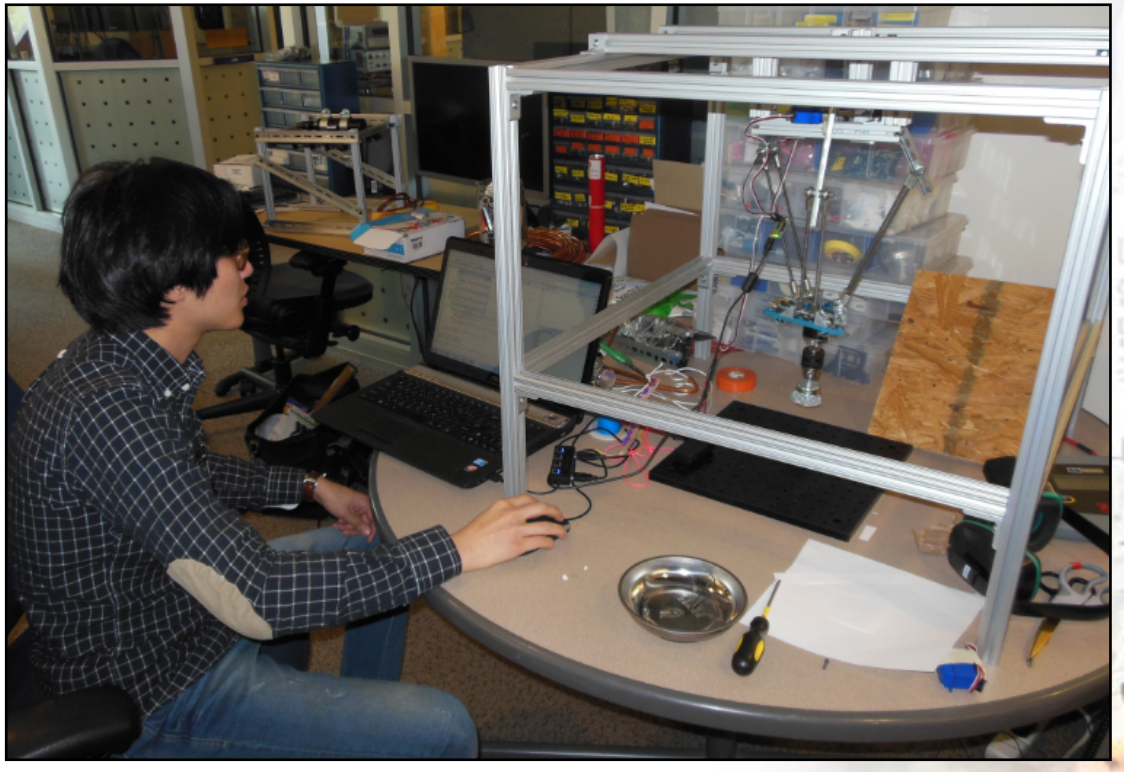
3. Delta Robot

Delta Robot Kinematics

- Control the Delta robot with the Pololu Micro Maestro 6-Channel USB Servo Controller.
- Python code, serial communication, GUI.



< Schematic of the Delta robot (courtesy to https://noahctodd.word press.com) >



< Control of the Delta robot >

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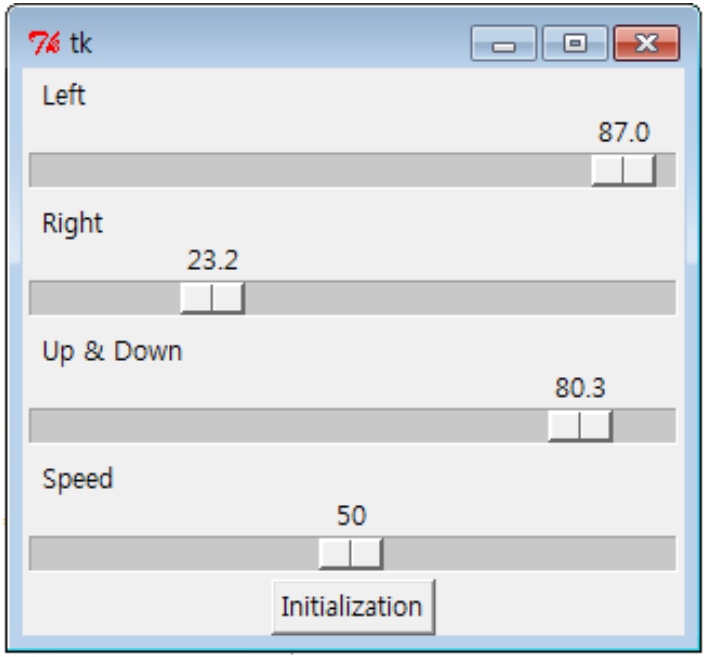
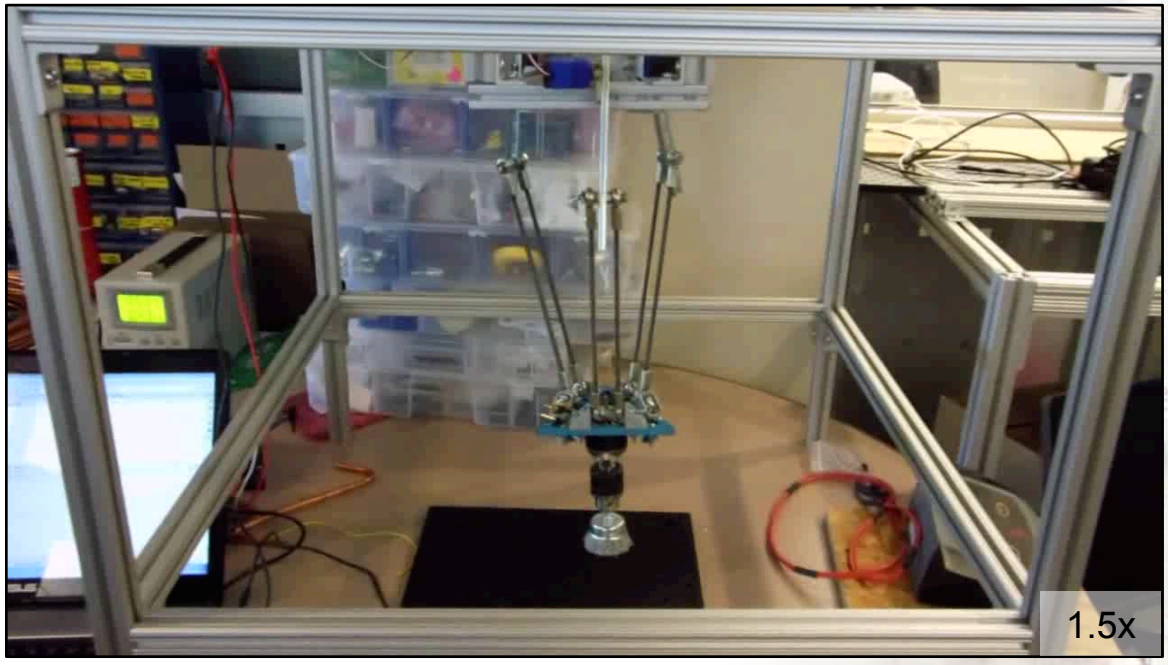


< GUI for controlling the Delta robot >

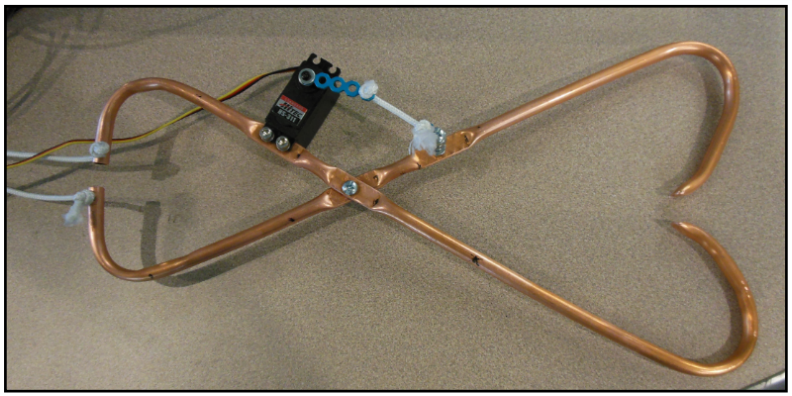


< Control of the Delta robot >

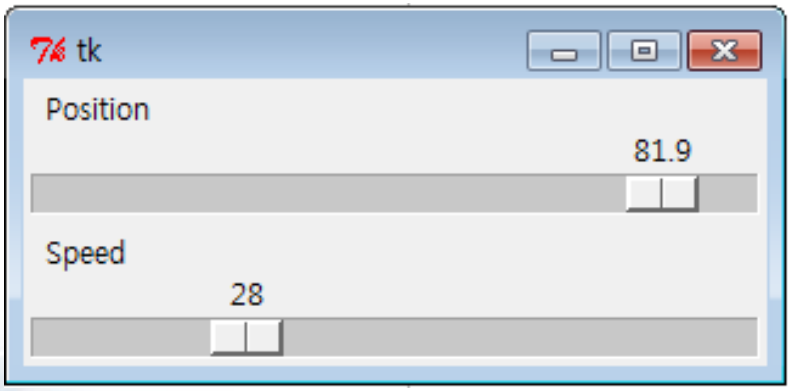
4. Servo Hook

Servo Hook

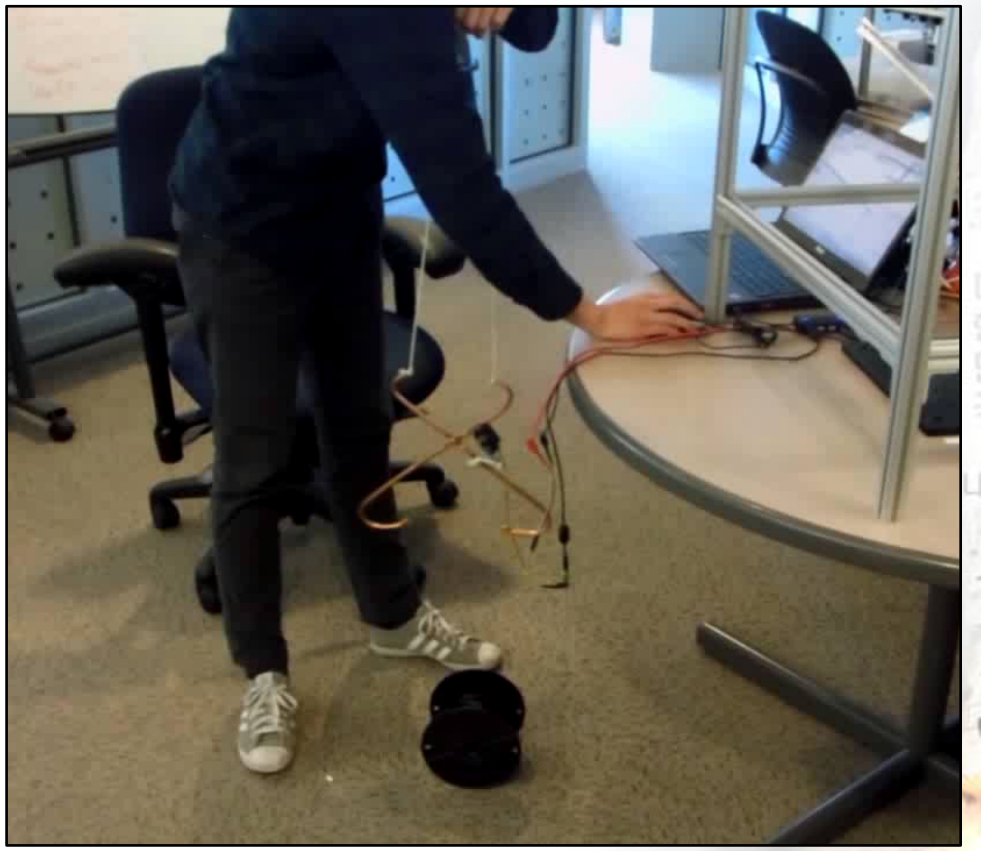
- To pick up something like a eagle's foot.
- Python code, serial communication, GUI, servo motor, thread.



< Servo hook >



< GUI for controlling the Servo hook >



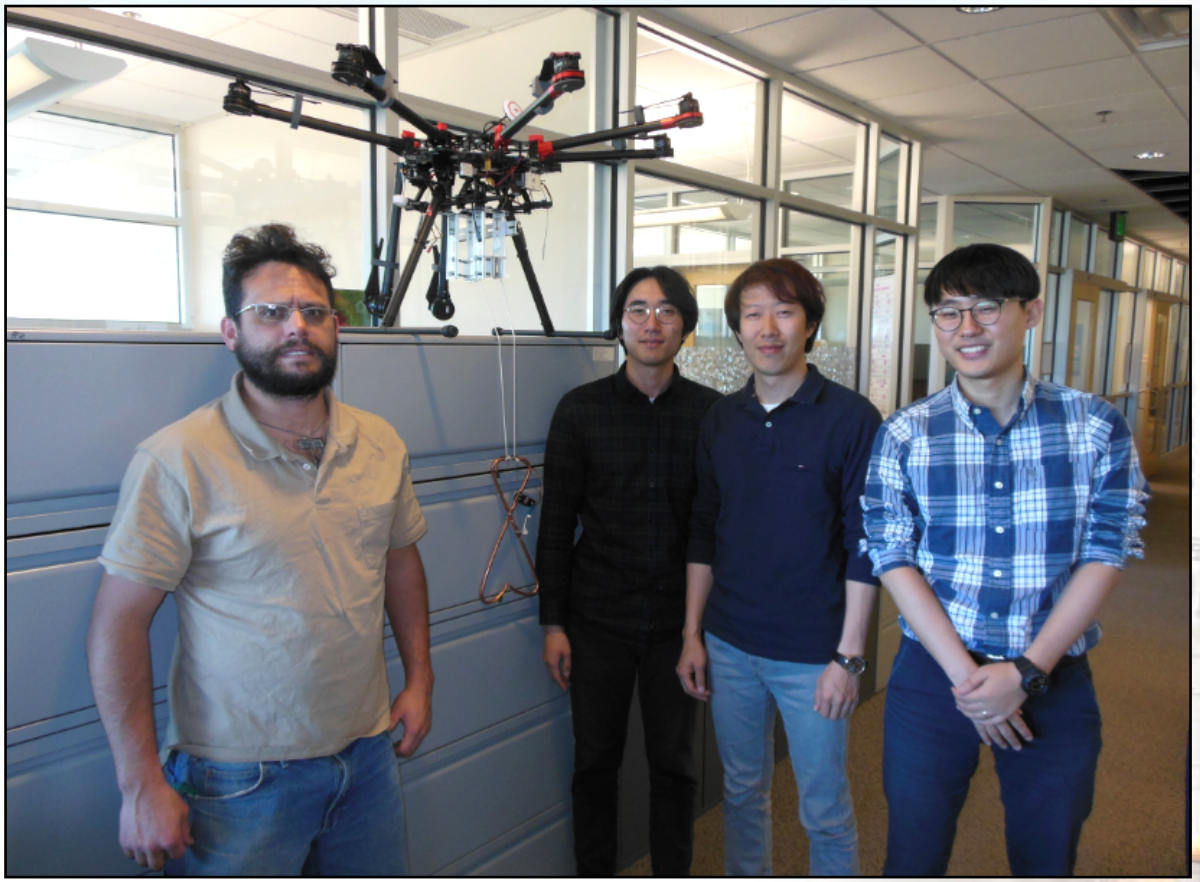
< Control of the Servo hook >

4. Servo Hook

Servo Hook

- Installation for drone to pick up something like a eagle's foot.

< Drone with Servo hook >

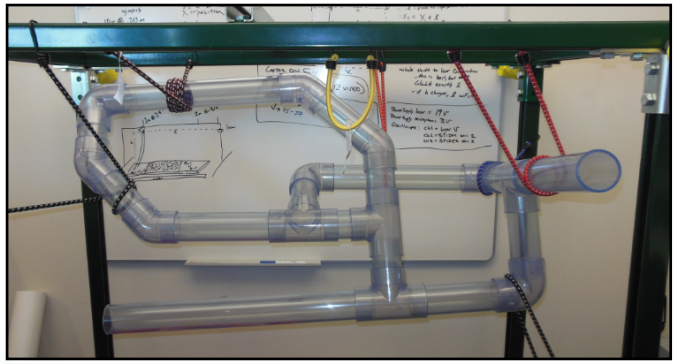


< Group picture with Servo hook-installed drone >

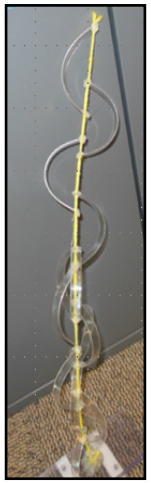
5. Conclusion

Summary

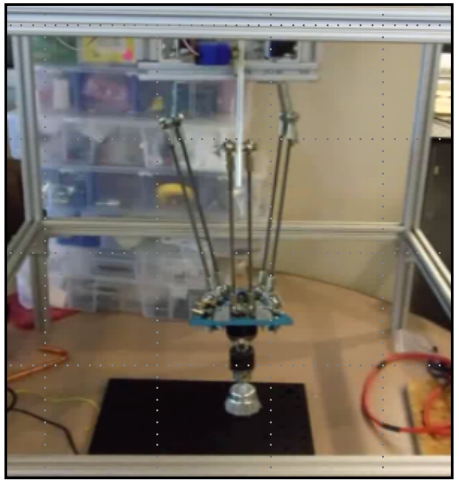
- Construction the narrow pipeline for damage detection inside it with SMA.
- Development of the string tower.
- Control of Delta robot using Python serial communication and GUI.
- Development of the Servo hook-installed drone.



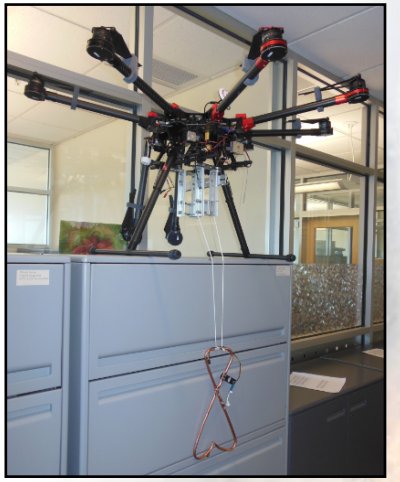
< Narrow pipeline >



< String tower >



< Control of the Delta robot >



< Drone with Servo hook >